SELECTION EFFECTS OF LENDER AND BORROWER CHOICES ON RISK MEASUREMENT, MANAGEMENT AND PRUDENTIAL REGULATION

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Thi Mai Luong, declare that this thesis is submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in the Finance Discipline Group at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution. This research is supported by UTS International Research Scholarship and UTS President's Scholarship.

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ABSTRACT

Empirical studies rely on features of observed data to gain new knowledge. However, data sets are often subject to selection bias. Recently, researchers have paid more attention to the impact of sample selection bias on outcome processes. In banking, selection is based on both lender and consumer choices and significantly affects outcomes of risk performance. This thesis presents three studies on the selection effects of lender and borrower choices on risk measurement, management and prudential regulation.

The first study investigates the voluntary selection of banks to participate in a government guarantee scheme implemented during Global Financial Crisis 2008 – 2009 in Australia. First, we find strong empirical evidence that Australian banks that entered into the wholesale funding guarantee scheme offered by the Australian Government experienced a significant reduction in their funding costs and funding premiums. However, we also show that the subsequent removal of the guarantee scheme did not result in a full repricing of funding costs to normal levels. Further, the guarantee program did not cause excessive risk taking in terms of general bank risk, asset risk, or liquidity risk. Additionally, banks allocated the additional debt funding to residential mortgage loans coincided with a period of strong growth in house prices in Australia. The findings contribute to bank risk management on the liability side.

The second study investigates the impact of prepayment selection on default likelihood. First, we document that prepayment and default are linked in a u-shaped pattern. Default risk is high for two distinct groups. The first group includes borrowers who have low prepayment risk as suggested by observed factors (unconditional effect). The second group includes borrowers who have high prepayment risk but did not refinance and remain in the sample post prepayment (selection effect). Second, the main cause for a high default rate in upturns is a

selection effect, while that for high default in downturns is an unconditional effect. Third, industry practice models result in a significant error in default calibration. We propose a two-stage model with a novel correction term to achieve a better default prediction than industry and literature models. The findings contribute to bank risk measurement and management on the lending side.

The third study explores two approaches to predict prepayment risk and default risk in the multi-period setting: a life-cycle model and a forward model. Using data of US fixed-rate prime mortgages from 2000–2016, we find that both models perform equally well for prepayment and default predictions in the first three years, while the accuracy of both models decreases for longer periods. A life-cycle model provides a better calibration for later ages, while a forward model is more accurate in forecasts for periods beyond three years. We analyze the impact of prepayment selection on multi-period default predictions. We find that a default model, which controls for prepayment selection, provides more accurate default probabilities in long run than a model without selection. The mean absolute error can reduce by nearly 50% if controlling for prepayment selection. Our findings are useful for banks to assess more accurately mortgage risk over the loan lifetime and to implement loan loss provisioning changes under international accounting standards

CONTENTS

CERTIFICATE OF ORIGINAL AUTHORSHIP ..... **i**
ACKNOWLEDGEMENTS ..... **ii**
ABSTRACT ..... **iii**
LIST OF TABLES ..... **viii**
LIST OF FIGURES ..... **ix**
LIST OF ABBREVIATIONS ..... **x**
Chapter 1: Introduction **1**
1.1 Motivation 1
1.2 Literature review 6
1.2.1 Inclusion selection 6
1.2.2 Exclusion selection 7
1.2.3 Survivorship selection 8
1.3 Thesis contributions 10
1.4 Thesis structure 11
Chapter 2: The Impact of Government Wholesale Guarantees on Banks' Funding Costs and Lending Behavior: Evidence from a Natural Experiment **13**
2.1 Abstract 13
2.2 Introduction 13
2.3 Background 18
2.3.1 Australian banking sector 18
2.3.2 Wholesale Funding Guarantee Scheme 19
2.4 Literature review and research questions 20
2.4.1 Determinants of banks' funding costs and funding premiums 20
2.4.2 Guarantees and bank risk-taking 22
2.5 Empirical framework 24
2.5.1 Control for WGS selection 25
2.5.2 Test of the adoption of the WGS guarantee 25
2.5.3 Test of the removal of the WGS guarantee 27
2.5.4 Test of bank risk-taking 27
2.5.5 Test of the impact of the WGS on bank loan growth 28
2.5.6 Robustness check: propensity score matching with bootstrapping 29
2.5.7 Robustness checks: bond yield spread analysis 30
2.6 Empirical results 31
2.6.1 Data 31
2.6.1.1 Dependent variables: bank funding costs *34*
2.6.1.2 Bank funding costs by WGS participation *35*
2.6.1.3 Control variables: bank characteristics and macroeconomic variables *39*
2.6.2 Regression results 41
2.6.2.1 The effect of the adoption of WGS *41*
2.6.2.2 The effect of the removal of WGS *46*
2.6.2.3 Bank Risk-taking *47*
2.6.2.4 Relationship between the WGS and loan growth *49*
2.6.3 Robustness check 49
2.6.3.1 Propensity score matching with bootstrapping *49*

2.6.3.2 Bond yield spreads *52*
2.7 Conclusions 57
Chapter 3: Prepayment Selection in Mortgage Credit Risk 59
3.1 Abstract 59
3.2 Introduction 59
3.2.1 Motivation 59
3.2.2 Research approach 63
3.3 Literature review 66
3.3.1 Common factors of prepayments 66
3.3.2 Common factors of the defaults 67
3.3.3 Relation between prepayments and defaults 68
3.3.4 Contributions of our study 70
3.4 Modelling frameworks 71
3.4.1 Default process without sample selection 71
3.4.2 Default process with prepayment selection 72
3.4.3 Two-stage default model with prepayment correction 75
3.5 Decomposition of observed effect 77
3.5.1 Unconditional effect and selection effect 77
3.5.2 Simulation study 78
3.5.2.1 Data generating process and model set up *78*
3.5.2.2 Results *81*
3.6 Empirical analysis 83
3.6.1 Data description 83
3.6.1.1 Dependent variables *84*
3.6.1.2 Risk factors *86*
3.6.2 Multivariate regression models 93
3.6.2.1 Pooled data *93*
3.6.2.2 Economic upturns and downturns *96*
3.6.2.3 LTV below and above 80% in economic upturns and downturns *99*
3.6.2.4 PDs calibration and accuracy of models *103*
3.6.2.5 Out-of-sample forecasts *106*
3.6.2.6 Robustness checks *108*
3.7 Conclusions 112
Chapter 4: Multi-Period Forecasts of Mortgage Credit Risk in the Presence of Prepayment Selection 114
4.1 Abstract 114
4.2 Introduction 114
4.2.1 Motivation 114
4.2.2 Research approach 117
4.3 Literature review 120
4.3.1 Concepts of modelling term structures 120
4.3.2 Credit risk by life-cycle models 122
4.3.3 Credit risk by forward models 124
4.4 Modelling frameworks 125
4.4.1 Life-cycle modelling approach 125
4.4.2 Forward modelling approach 128
4.4.3 Formulas for survival probability and unconditional probability 130
4.5 Empirical analysis 131
4.5.1 Data source 131
4.5.1.1 Dependent variables *132*

4.5.1.2 Control variables *134*
4.5.1.3 Relationship between dependent and control variables *135*
4.5.2 Life-cycle models for mortgages 136
4.5.3 Forward models for mortgages 142
4.6 Validation 150
4.6.1 Validation 1: multi-year forecasts for loans since origination by age 150
4.6.2 Validation 2: multi-year forecasts for the portfolio by time 154
4.6.3 Robustness check 158
4.7 Conclusions 160
Chapter 5: Conclusions 163
5.1 Summary of key findings 163
5.2 Implications of the thesis 165
Appendix 168
Bibliography 171

LIST OF TABLES

Table 1.1 Literature of sample selection process 2
Table 1.2: Relationship of thesis chapters to bank activities 4
Table 2.1 Definition of variables 33
Table 2.2 Summary statistics of variables by periods 38
Table 2.3 Summary statistics of variables by big and small guaranteed banks 39
Table 2.4 Selection model for bank-level WGS participation 41
Table 2.5 Impact of WGS participation and removal on funding costs 43
Table 2.6 Sensitivity of the WGS to wholesale funding 45
Table 2.7 Impact of WGS participation on bank risk-taking and loan growth rates 48
Table 2.8 Robustness check: ex-ante characteristics on propensity score matching 50
Table 2.9 Robustness check: results on bootstrapping test 51
Table 2.10 Robustness check: summary statistics of bonds issued by Australian banks 53
Table 2.11 Robustness check: selection model for bonds guaranteed 54
Table 2.12 Robustness check: impact of WGS participation on bond yield spreads 55
Table 3.1 Definition of variables 86
Table 3.2 Summary statistics of variables on the pooled data 90
Table 3.3 Summary statistics of variables on subsamples with LTV below and above 80% in upturns and downturns 92
Table 3.4 Regression results on pooled data 93
Table 3.5 Regression results on subsamples of upturns and downturns 97
Table 3.6 Regression results on subsamples with LTV below and above 80% 100
Table 3.7 Model calibrations for predicted PDs by prepayment risk levels 104
Table 3.8 Accuracy of in-sample predicted PD across models 105
Table 3.9 Accuracy of out-of-sample PD forecasts across models 107
Table 3.10 Robustness check: accuracy of predicted PD across models 110
Table 4.1 Comparison of life-cycle model and forward model 120
Table 4.2 Related literature using two approaches for multi-period forecasts 121
Table 4.3 Definition of variable used 132
Table 4.4 Summary statistics of variables by loan age and time 133
Table 4.5 Summary statistics of dependent and control variables used 136
Table 4.6 Regression results of life-cycle models 138
Table 4.7 In-sample calibration of life-cycle models 141
Table 4.8 Regression results of forward models 143
Table 4.9 In-sample calibration of forward models 149
Table 4.10 Validation 1: multi-year forecasts for loans since origination by age 153
Table 4.11 Validation 2: multi-year forecasts for portfolios at a base year by future year 157
Table 4.12 Robustness check: validation tests for different default proxies 160

LIST OF FIGURES

Figure 2.1. WGS participation activities 20
Figure 2.2. Bank funding costs over time 34
Figure 2.3. Bank funding costs by participation 36
Figure 3.1. Cumulative prepayment and default rates over loan age 60
Figure 3.2. Two-stage selection mechanism 61
Figure 3.3. Simulation: unconditional effect, observed effect and selection effect 82
Figure 3.4. Empirical data: prepayment and default rate over time 85
Figure 3.5. Relation between prepayment risk and default risk on pooled data 96
Figure 3.6. Relation between prepayment risk and default risk in upturns and downturns 99
Figure 3.7. Relation between prepayment risk and default risk by LTV levels 102
Figure 4.1. Estimates of key factors in forward prepayment models 145
Figure 4.2. Estimates of key factors in forward default models 147
Figure 4.3. Validation 1: multi-year forecasts for loans since origination 152
Figure 4.4. Validation 2: multi-year forecasts for portfolios at a base year by future years 155
Figure 4.5. Robustness check: different proxies of default 159

LIST OF ABBREVIATIONS

ADI	Authorised deposit-taking institution
AFT	Accelerated failure time
APRA	Australian Prudential Regulation Authority
AUROC	Area under receiver operating curve
CCR	Credit correction ratio
CDF	Cumulative distribution function
CPH	Cox proportional hazards
DTI	Debt-to-income
GFC	Global Financial Crisis
HPI	House price index
IFRS 9	International Financial Reporting Standard 9
IMR	Inverse Mills Ratio
LTV	Loan-to-value
LIBOR	London Inter-bank Offered Rate
MAE	Mean absolute error
MNL	Multinomial logit
PD	Probability of default
PP	Probability of prepayment
US GAAP	United States Generally Accepted Accounting Principles
WGS	Wholesale Government Guarantee Scheme